# Live Domain Technology Gaps and Science and Technology (S&T) Insertion

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# Live Domain S&T Focus

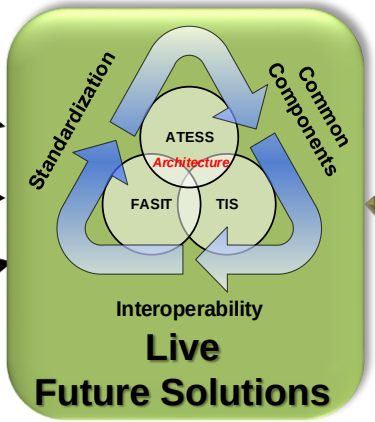
TRADOC
- Risk Reduction
- Gap Prioritization
- S&T Focus Areas

Force 2025 and Beyond
- Improve Joint Combined Arms Operations
- Integrate Innovative DOTMLPF
- Maintain Overmatch in Cross-Domain Operations

FASIT

ATESS

TIS




FHTLS

STE
- Architectures
- Standards
- Interfaces

STE Future Solutions

Army Warfighting Challenges
- Grow Adaptive Army Leaders
- Optimize Soldier Performance
- Maximize Demand Reduction
- Improve Reliability
- Maintain Overmatch

# Live Domain Programmatic/Technical Gaps

| | | |
|---|---|---|
| **ATESS** | #11 – Improved Audio/Visual/Tactile Effects | #9 – Mission Command Integration with AAR |
| #1 – Indirect Fire (mortar/artillery) | #12 – Improved Weapon Effects | #10 – Stimulate JISR Assets |
| #2 – Real Time Casualty Assessment | **TIS** | #11 – LVC Simulation Interoperability |
| #3 – Automated Damage Assessment | #1 – Near Real Time V/C/G Interoperability | #12 – Maximize use of Organic Equipment |
| #4 – Battlefield Realism | #2 – Mission Command Interoperability | **FASIT** |
| #5 - Indirect Fire (grenade/Precision) | #3 - Stimulate Rotational Assets | #1 - Trackless/Autonomous Targets |
| #6 – Real Time Casualty Assessment (improved) | #4 - Interact within the Integrated Training Environment (ITE) | #2 - Dynamic Thermal Representations |
| #7 – Casualty Tracking | #5 - Core Instrumentation Architecture | #3 - Improved Non-Contact Hit Sensors |
| #8 – Counter Sniper | #6 – Real Time V/C/G Interoperability | #4 – Virtual Target Silhouettes on Live Fire Ranges |
| #9 - Additional Weapon Effects | #7 – Integrated Testing/Training Architecture | #5 - Cooperative ID Target Silhouettes |
| #10 – Improved Battlefield Realism | #8 – JTE Interoperability | #6 - Threat Emitters |

# Live Domain Force on Force

## ATESS: Next Generation Force on Force Engagement Simulation System

| Training Gap Example | Derived Capabilities | S&T Technologies |
|---|---|---|
| Indirect Fire Visualization | • Credible Audio/Visual Cues<br>• Accurate visual representation<br>• Accurate time of flight | • Augmented Reality*<br>• Digital Terrain*<br>• Weapon Orientation<br>• Position/Nav |
| Real Time Casualty Assessment (RTCA) | • Automated Casualty Cards<br>• Automated wound placement/severity<br>• Automated casualty tracking<br>• Casualty visualization<br>• Casualty treatment | • Augmented Reality*<br>• Engagement and Protective system modeling<br>• Haptic/Tactile cues |
| Battlefield Realism | • Credible audio/visual/tactile cues for all participants<br>• Real-time effects (directed energy, non-lethal<br>• Battle damage assessments | • Augmented Reality*<br>• Digital Terrain*<br>• Weapon Orientation<br>• Position/Nav<br>• Haptic/Tactile cues |

* Requires synchronization/alignment with STE S&T investment

# Live Domain Training Instrumentation

## TIS: Instrumenting the Live Domain and supporting the future ITE

| Training Gap Example | Derived Capabilities | S&T Technologies |
|---|---|---|
| Near Real Time V/C/G Interoperability | • 5 Second Latency<br>• Extended distances (45x50Km)<br>• 98% Accuracy<br>• Low, Mid, and Peak Engagements | • Signal Modulation Processing<br>• Digital Terrain*<br>• Augmented Reality*<br>• Advanced Database |
| Interact within the Integrated Training Environment (ITE) | • V/C/G entities engaging/interacting with Live Player<br>• Live Players perceiving the V/C/G effects | • Augmented Reality*<br>• Advanced Data Networks<br>• Advanced Database |
| Real Time V/C/G Interoperability | • No Latency<br>• Extended distances (160x160Km)<br>• 99.5% Accuracy<br>• Low, Mid, and Peak (data flash floods) Engagements | • Signal Modulation Processing<br>• Digital Terrain*<br>• Augmented Reality*<br>• Advanced Database |

* Requires synchronization/alignment with STE S&T investment

# Live Domain Force on Target

| FASIT: Next Generation of Live Fire Ranges | | |
|---|---|---|
| **Training Gap Example** | **Derived Capabilities** | **S&T Technologies** |
| Trackless Moving Targets | • Autonomous and Reactive Behaviors<br>• Vehicle and Infantry versions<br>• Live Fire survivable<br>• Operation on unimproved terrain | • Robotics<br>• Digital Terrain*<br>• Position/Nav |
| Dynamic IR Representation | • Time and Posture Based Thermal/IR<br>• Align with ROC-V<br>• High Fidelity images<br>• Removed from Line of Fire | • IR Projection |
| Non-Contact Hit Sensors | • Supports Super-sonic, Trans-sonic, and sub-sonic munitions<br>• Detect angle of incident<br>• Round identification<br>• High Fidelity Point of Impact | • Optic Ballistic Detection |
| Virtual Target Silhouettes | • Silhouette Realism (appearance and behaviors)<br>• Free space | • Augmented Reality*<br>• Digital Terrain*<br>• AI |

# Current Live Domain S&T Investments

| | |
|---|---|
| Hybrid Laser | Laser and detector technology that can operate in both training and tactical wavelengths |
| New 1550 wavelength MILES | Better penetration of obscurants, Laser continues past effective range of weapon, Eye Safe |
| Laser Encoding and Decoding | Investigate modern encoding, error-correction methods and signal processing techniques |
| Orientation sensor | Small Arms Direct fire solution |
| GPS Denied tracking | Sensor fusion for dismounted tracking in GPS denied environments |
| High Fidelity Terrain | Enable indirect (geo-pairing) weapon simulation with real-time dynamic updates |
| Forward Observer AR | Artillery/Mortar augmentation of simulated indirect fire effects |
| Mk19 Virtualization | Show virtual ballistic fly-out on see-through HMD correlated with azimuth/elevation orientation |
| Trackless Moving Targets | Moving target that can be utilized on unimproved terrain, and that is capable of autonomous behaviors |
| Dynamic Infrared Projector | Create accurate real-time dynamic thermal representations on target silhouettes or other mediums |
| Non-Contact Hit Sensor | Detection field capable of determining ballistic penetration, its location, its velocity, and can accurately identify munitions types |
| Video Compression | Compression software that automatically adapts to video scene content when encoding video for transmission |

# TSIS Live Training Panel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# Live Domain Technology Goals

1. Align with STE and support transition to FHTE-LS
2. Evolve current training systems in support of ATESS/ TIS/FASIT Requirements
3. Maintain Relevancy with evolving weapon systems, platforms and TTPs
4. Evolve current training systems in support of Army Operational Environment and  Force 2025
5. Reduce Total Life Cycle Costs

***Evolving the PM TRADE product line thru technology, architectures, standards, and commonality to achieve future capability needs***